L5: Entry 2 of 3 File: USPT May 28, 2002

DOCUMENT-IDENTIFIER: US 6396842 B1
TITLE: Method of searching using longest match based Randix Search Trie with variable length keys and having prefix capability

Brief Summary Text (59):
The byte of data may comprise a Private Network Node Interface (PNNI) level value and the list may comprise a circularly linked list. The method further comprises the step of incrementing the count field of an entry in the list when a key is added to the tree, the entry corresponding to the length of the key and the step of decrementing count field of an entry in the list when a key is removed from the tree, the entry corresponding to the length of the key.

Detailed Description Text (14):
The method of inserting a key into the search trie tree will now be described. A flow diagram illustrating the method of inserting a prefix into the search trie tree is shown in FIG. 7. The first step is to make the address prefix, i.e., the key, unique by adding one byte to the beginning of the address prefix. The byte that is added has the value of the length of the address, i.e., its level (for PNNI networks) (step 160). This step adds 8 bits to each address. Thus, the maximum address has a length of 152+8 =160 bits (20 bytes for PNNI). As a result of this step, if there are two addresses, wherein one is the prefix of the other, adding the length byte to them makes each address unique. Note that the key stored in the tree has a length equal to one byte plus the length of the address prefix. Typically, the length of the address prefix is less than the maximum length for node addresses. However, it is entirely possible that the length of all the addresses is the maximum address length of 19 bytes (note that the selector byte is preferably not stored).

Detailed Description Text (29):
Each tree 150, 152, 154 comprises a conventional radix trie tree, i.e., Patricia tree. The advantage of splitting the tree into multiple trees is that there is no need to add the address length byte to the beginning of the addresses thus saving that particular step. Now, however, rather than requiring one radix tree to be handled, a plurality of trees must be maintained, one for each different length.

CLAIMS:

15. A method of searching utilizing a conventional Patricia search tree constructed from one or more nodes for storing one or more keys, said method comprising the steps of:

inserting a key into the tree:

modifying said keys to be inserted into the tree so as to make each key unique with respect to other keys that may be prefixes thereof, said step of modifying a key comprises adding a byte of data to the beginning of a key, said byte of data having a value equal to the length of said key, said byte of data comprises a Private Network Node Interface (PNNI) level value;

inserting said modified each key into the tree utilizing a conventional Patricia search tree algorithm;

providing a list which includes entries for each different key length represented in the tree, each entry in said list including a length field and a count field;

updating said list so as to maintain said entries in descending numerical order of the length field;

searching the tree for a search key:

determining the largest key length in said list;

concatenating the key length onto the search key to form a modified search key;

searching said tree with said modified search key utilizing a conventional Patricia search algorithm; and

determining the next largest key length in said list and repeating said steps of concatenating and searching until either said modified search key is found or the entries in said list are exhausted.

First Hit Fwd Refs

**End of Result Set**

Generate Collection Print

L2: Entry 1 of 1 File: USPT Mar 10, 1992

DOCUMENT-IDENTIFIER: US 5095458 A

**** See image for Certificate of Correction ****

TITLE: Radix 4 carry lookahead tree and redundant cell therefor

Brief Summary Text (22):

The present invention also encompasses means for extracting carries at regular boundaries from a high radix tree. More specifically, in embodiments of the present invention, the means for extracting carries may include one or more redundant nodes placed across the tree.

Detailed Description Text (23):

In another variation, all of the blocks on the first logic level may be deleted from the tree shown in FIGS. 11A and 11B, and the bit propagate and generates sent directly into the second level. This new configuration can produce every other carry for a 16 bit add in two gate delays. The addition of further redundant cells can be used to find all of the carries without increasing the number of gate delays.

Detailed Description Text (26):

It should now also be appreciated that a circuit according to the present invention arranges fundamental carry chains in to a high radix tree.